

6 January 1993

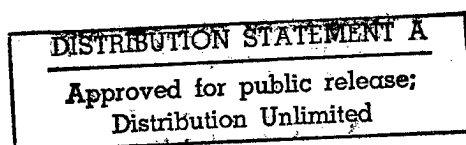


JPRS Report

Science & Technology

***Central Eurasia:
Electronics & Electrical Engineering***

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Original Method of Drying Wide-Format Photographic Materials

937K0027A Moscow *TEKNIKA KINO I*
TELEVIDENIYA in Russian No 5, May 92 pp 28-30

[Article by Ye. F. Ivanova and A. A. Chekhovich, All-Russian Scientific Research Institute of Cinematography]

[Abstract] A new method of convective drying of photographic material has been devised, the conventional centrifugal blower being replaced with an axial one so to allow reducing both the dryer size and the noise level. The method was tested with a 1.25 EV-2.8-6-3270 UCh high-speed (2700 rpm) blower delivering air at a rate of 280 m³/h under a total pressure of 60+/-10 Pa. This blower draws a power of only 28 W, weighs only 0.8 kg, and is driven by an electric motor built into the impeller. Its overall dimensions are 140 x 140 x 50 mm³ and its noise level is 11 dB below that of the centrifugal blower now in use. The method was tested with the blower mounted in a square frame and operating in two different simple aerodynamic model configurations: 1) blower covering a round inlet hole in the front wall of a dryer cabinet which had a nozzle array of 6-7 parallel slots in the top wall, air thus entering horizontally and leaving vertically upward at a velocity of 10 m/s; 2) blower above a round inlet hole in the top wall of a dryer cabinet which had a nozzle array of 6-7 parallel slots in the bottom wall so that, air thus passing through the cabinet vertically downward without change of direction at a velocity of 11.4 m/s. A practical system for drying wide-format photographic materials has been designed on the basis of those model tests. The photographic film is air-heated from above and from below while it passes horizontally between two rows of calendar rollers, each of the two axial blowers driving air through an array of seven distributor nozzles surrounded by electric heater coils. Such a system is suitable for a dryer operating separately or together with a developing machine. Figures 2; references 2.

Standard Tapes for Alignment and Inspection of VHS Recorders

937K0027B Moscow *TEKNIKA KINO I*
TELEVIDENIYA in Russian No 5, May 92 pp 35-40

[Article by M. I. Kharitonov, All-Russian Institute for Upgrading Skills of Television and Radio Broadcasting Personnel, and V. I. Kuznetsov, Scientific-Industrial Association's "Elektronika" Scientific Research Institute of Consumer Video Equipment Engineering, Voronezh]

[Abstract] Manufacturers of consumer helical-scan video tape recorders use seven types of standard tapes for production control: 1) 12 LIT.SCh.2 for adjustment of audio head mounting height and inclination angle; 2) 12 LIT.SCh.2 tapes for regulating path of tape movement under tension at the audio channel exit; 3) 12 LIT.SD.2 tapes for controlling quality of image, instability of line frequency, tape speed, and detonation coefficient; 4) 12 LIT.TsU.2 tapes for controlling playback of PAL and SECAM signals playback; 5) 12 LIT.K tapes for inspection of audio channel performance in "record only" mode; 6) new 12 LIT.I.2 tapes for regulating automatic control of switching pulse position in video head; 7) new LIT.P.2 tapes for high-precision regulation of tape transport mechanism. One method of setting the inclination angle of the nonmagnetic gap in the magnetic head is

to set it so as to match the diagram of a signal recorded by one magnetic head in a single track, the undesirable necessity of manipulating the head from its already set height position being eliminated by use of a signal consisting of segments recorded with the magnetic stroke alternately at known 90°+ ψ_0 and 90°- ψ_0 angles relative to the direction of tape movement. The magnetic head is then in the correct position when the playback signals have equal amplitudes. Another method of setting the inclination angle of the nonmagnetic gap in the magnetic head is to set it so as to match the diagram of two signals recorded by two magnetic heads in a different track each. In this case it can be done by use of two standard tapes in "phase opposition" or, simpler and more precisely, by use of two unequally wide tracks. A third possibility is simultaneous height and angle regulation by use of two different kinds of signals, say a 7 kHz high-frequency sequence of radio pulses of 10 ms duration in the upper track synchronized with the television fields and say a 1 kHz low-frequency continuous signal in the lower track. Figures 10; references 5.

Modification of LETI-60M Slide Projector for Dynamic Light Effect

937K0027C Moscow *TEKNIKA KINO I*
TELEVIDENIYA in Russian No 5, May 92 pp 56-58

[Article by B. M. Galejev, Students' Design Office "Prometei" (Prometheus) at Kazan Institute of Aviation]

[Abstract] Various accessories for the LETI-60M slide projector have been conceived and designed which convert this projector into an original instrument for production of light effects such as dynamic color fillers or for display of optophonic music telecasts. These accessories include kaleidoscope attachments to the objective and a slide rotating mechanism which replaces the linear film tape transport mechanism but uses the same electric drive motor along with the same "dovetail" jack. Use of a d.c. motor wide-range speed variation and also reversal. Three kaleidoscopes have been designed requiring minimum changes in the basic other LETI-60M projector components, prototypes of each then having been built with the author's participation: "Kaleydofon-1" with a set of interchangeable tubes mounted one at a time; "Kaleydofon-4RM" with four interchangeable tubes and sets of surface-coated multifacet (from 3 to ∞) mirror prisms (Engineer R. F. Sayfullin); "Kaleydofon-36" with six tubes mounted together in 36 possible combinations, with manual or automatic remounting for each combination and with discrete ON-OFF switching of tubes (Engineer K. N. Gimazutdinova). Figures 3; references 8.

Russian Federation's Law Regarding Mass Communication Media

937K0028A Moscow *TEKNIKA KINO I*
TELEVIDENIYA in Russian No 6, Jun 92 pp 3-6

[Article by A. Altayskiy]

[Abstract] The sixteen articles in the Russian Federation's law regarding mass communication media most relevant to motion picture and television practitioners, as published in the 8 February 1992 issue of the "Rossiyska Gazeta", are: 1) article 8 pertaining to registration of mass communication enterprises; 2) article 10 pertaining to announcement about registration; 3) article 11 pertaining to notification about

registration renewal; 4) article 12 pertaining to registration waivers; 5) article 19 pertaining to status of editorial staff; 6) article 20 pertaining to composition of editorial staff; 7) article 22 pertaining to contract negotiations; 8) article 24 pertaining to alternative mass communication media; 9) article 27 pertaining to information which printed periodical issues must must provide; 10) article 31 pertaining to broadcast licenses; 11) article 33 pertaining to artificial (industrial) interference and countermeasures; 12) article 34 pertaining to storage of copies of radio and television broadcast material (1 month) and of printed material (1 year) as evidence for resolution of potential law suits; 13) article 36 pertaining to advertisement; 14) article 37 pertaining to erotic content; 15) article 39 pertaining to inquiries by editorial staff about government agencies and public institutions; 16) article 40 pertaining to refusal of information classified by government agency, commercial enterprises, or special legal order as secret.

EUTELSAT: Satellite Television for Russia

937K0028B Moscow *TEKHNICA KINO I*
TELEVIDENIYA in Russian No 6, Jun 92 p 17

[Article by Bukhali Salem Ben Ali]

[Abstract] Recent announcement about expansion of the EUTELSAT coverage to East Europe holds out the possibility that it will eventually also cover at least a part of the CIS (Russia-Belarus-Ukraine) territory. Relevant to this are the imminent merger of the EUB (European Radio Broadcasting Union) with the OIRT (International Radio and Television Organization) planned to take place in 1993 and the possibility of placing two Eutelsat II satellites at the same point on a stationary orbit for simultaneous broadcast of up to 40 programs from that point. Negotiations regarding have already begun between the EUTELSAT management and the European Commission's Green Paper regarding environmental protection and other problems associated with satellite communication systems. EUTELSAT now operates a communication system with fixed and moving objects covering the European territory and based on use of seven satellites.

"Infracom" Infrared Communication Technique in Television

937K0028C Moscow *TEKHNICA KINO I*
TELEVIDENIYA in Russian No 6, Jun 92 pp 26-33

[Article by L. S. Leytes, Television Engineering Center, Moscow]

[Abstract] The state of the art in infrared communication is reviewed and use of this technique in television is examined, considering its advantages (interference-free simultaneous operation of several identical "infracom" systems even in close vicinity of one another, interference-free combined operation with radio equipment in the studio or with objects outside the studio; high quality of monaural and stereophonic program transmission; speech channel wider than that in other communication systems such as local telephone networks and AM radio) and also its drawbacks (possibility of short breaks caused by shielding objects randomly involuntarily crossing the paths between transmitter and receivers; interference by high-intensity light in the studio; frequency band narrower than that of multi-channel communication systems such as FM radio). The key

components of "infracom" are the transmitter diode, GaAs or GaAlAs diode, and the receiver diode whose sensitivity spectrum extends over the narrow 900 nm emission band of the transmitter diode and the 400-700 nm visibility range of the human eye. All existing "infracom" systems are tentatively classified into those designed for distribution of programs and those designed for conferences, those of the first type being more common and less expensive. Two such systems are described in detail: the Sennheiser SZI 1019A and the Siemens SITRANS. Figures 13; tables 3; references 11.

State of Art and Outlook for Developments in Magnetic Recording Media

937K0028D Moscow *TEKHNICA KINO I*
TELEVIDENIYA in Russian No 6, Jun 92 pp 50-52

[Article by Yu. A. Vasilevskiy and L. I. Zelenina, Administrative Department, Scientific Research and Planning Institute of Photographic Chemicals Industry, Moscow]

[Abstract] A comprehensive survey of magnetic recording media and materials was made by the Scientific Research and Planning Institute of the Photographic Chemicals Industry (Moscow) jointly with the Scientific Research Institute of Magnetic Information Carriers (Shostka). This survey covers the 1969-89 period worldwide including the USSR and outside the USSR only. The survey provides data on production volumes and production costs of conventional powder-metal as well as of more recently available wrought metal-layer and metal-coated tapes, disks, cards, and other forms of carriers used not only for magnetic sound and video recording but also with computers and measuring apparatus. On the basis of past trends and market forecasts for the 1990-2010 period according to American manufacturers, projections are made for production of magnetic recording media in the 1991-2000 period. Note is taken of developments made in magnetic recording techniques aimed at higher packing density, namely azimuthal recording on contiguous tracks and use of servomotors in head drives, as well as of progress made in magnetic media technology and particularly development of the flexible disks. These features are expected to put magnetic recording media in a more competitive position relative to optical media with respect to cost and reliability, mainly owing to absence of thermal effects unavoidably attending laser action. Tables 2; references 8.

Commercial Cable TV System With Fiber Optics

937K0028E Moscow *TEKHNICA KINO I*
TELEVIDENIYA in Russian No 6, Jun 92 pp 52-55

[Article by B. N. Pershakov and Z. P. Luneva, Moscow Scientific Research Institute of Television Industry]

[Abstract] Use of fiber optics in commercial cable television systems is examined from the standpoint of performance features and advantages in terms of possible system improvement. The goals are to increase the number of channels to 20 or more, to ensure better reception than over airwaves with minimum additional home equipment and at a reasonable cost to the viewers, to introduce new services, to facilitate an eventual tie-in with the integrated-services digital network, to facilitate transmission of high-definition TV programs, and to facilitate addition of pay TV cable channels. The best method of TV signal transmission over

fiber-optic cables is shown to be amplitude modulation with partial sideband suppression. As the most appropriate place for installation of a fiber-optic cable TV receiver set is recommended the entertainment or recreation facility. Figures 1; references 3.

Prospective Elemental Base and Materials of Power Supplies for Motion Picture Equipment

937K0006A Moscow *TEKHNICA KINO I*
TELEVIDENIYA in Russian No 7, Jul 92 pp 39-45

[Article by G. M. Klushin, All-Russian Scientific Research Institute of Cinematography]

[Abstract] In consideration of the need to reduce size, weight, and cost of secondary electric power supplies for motion picture equipment besides elimination of transformers and chokes, the key performance characteristics of solid-state devices particularly suitable for this purpose are comprehensively explained and tabulated to facilitate selection and design. These devices include: silicon high-frequency high-voltage switching silicon power transistors, namely bipolar transistors (KT, 2T series) and junction field-effect transistors with static inductance (KP, 2P series); high-frequency diodes (KD, 2D series); quick-recovery stud diodes (DCh series) and high-speed stud thyristors (TB, TBK series) representing the only so far standardized second-generation semiconductor devices; high-frequency high-speed low-power thyristors (KU series, 2U series); high-speed GaAs Schottky-barrier diodes (DSh series); high-voltage polarized electrolytic aluminum blocking capacitors and nonpolarized dielectric-film filter capacitors. A typical application for the bipolar transistors, used in pairs, are Darlington amplifier and emitter follower modules (MTKD series). Materials available for components of small-size low-cost power supplies include electrical-grade steels (3422, 3423, 3424) for up to 0.05 mm thick magnetic tape, Permalloy (50NP, 34NKM, 79 NM) for up to 0.01 mm thick magnetic tape, molybdenum Permalloy (MP-60/140.160.250) for chokes, Mn-Zn ferrites (NMS), and amorphous electrical-grade steels. Tables 8; references 7.

Television System for Recording Vehicle License Plate Numbers

937K0006B Moscow *TEKHNICA KINO I*
TELEVIDENIYA in Russian No 7, Jul 92 pp 53-57

[Article by G. N. Gryazin, St. Petersburg Institute of Precision Mechanics and Optics]

[Abstract] A television system for traffic control and specifically identification of speeders has been developed, a closed system using two camera tubes. Camera 1 is mounted at a certain level above the road so that it covers a given road control segment and its horizontal sweep runs across the direction of traffic movement. Its video output signals are transmitted to a monitor as well as to a vehicle identifier. As a vehicle enters and leaves that control zone, the two video pulses generated at the respective instants of time proceed to a traffic violation pickup unit in which the vehicle speed is computed according to the formula $v = L/\Delta t$ (L - length of control zone, Δt - time of passage through distance L) if the vehicle has exceeded the speed limit. In that case the pickup unit sends a violation signal to a pulse shaper which forms pulses with a time delay necessary for releasing the shutter in camera 2 and for triggering a video tape recorder. This

camera sends video signals through an analog-to-digital converter to the buffer stage of a memory, which also receives digital signals from the pulse shaper and additional relevant digital data about the location, the speed limit, and the vehicle plate number. From here data are extracted and sent, through a digital-to-analog converter, to that same video tape recorder as well as to another monitor. This television system has been improved for meeting various additional requirements such as a higher response speed in traffic zones subject to higher speed limits, another requirement being selective recording of only plate numbers on vehicles exceeding the speed limit or the maximum permissible width. One new television system is designed to display a large-scale image of a license plate so as to simplify and accelerate the number identification by both operator and computer, especially under intricate background noise and interference conditions. It consists of a camera tube with a long-focus objective lens, a selective plate number detector with a built-in signal processor, an optomechanical scanner with a "jumping" mirror, and a control module. The camera is a photoconverter with an electron image tube and a PZS-M grid array of charge-coupled devices. The plate number detector employs a PZS-L linear array of charge-coupled devices. This television system incorporates novel features covered by three USSR patents. Figures 3; references 6.

Automatic System for Tracking Film Shooter's Object

937K0006C Moscow *TEKHNICA KINO I*
TELEVIDENIYA in Russian No 7, Jul 92 pp 66-67

[Article by Yu. V. Chumakov, Moscow Higher Technical School imeni N. E. Bauman, and A. B. Kosygin, Moscow Institute of Film Production "InnKo"]

[Abstract] A new accessory system SAS-3 for motion picture cameras has been developed by "InnKo" which automatically tracks the film shooter's object so as to allow the film shooter to concentrate entirely on the artistic aspects of film making. The problem of tracking an object under intricate luminous background conditions has been solved by placing an infrared beacon on the object and thus tagging it. Radiation from that beacon, which moves with the object, The beacon is an optoelectronic device the electronic module of which contains power supply, a modulation frequency generator, and an infrared radiator. The radiator, a 3L 119 or 3L 123 light-emitting diode inside a 6 mm long cylindrical envelope 3 mm in diameter, is mounted on the object and masked. The infrared radiation is received by a coordinate-sensitive photodetector mounted on the camera. The photodetector consists of two pairs of FD-20KP photodiodes in a quadrature configuration. Its output signals control the movements of the camera-carrying platform along two coordinates either in the horizontal plane or in the vertical plane. The tracking precision can be enhanced by use of an infrared radiator consisting of several light-emitting diodes connected in series. The camera attachment contains a fast objective lens with a 50 mm focal length and a 50 mm aperture diameter, an infrared light filter for increasing the signal-to-noise ratio, and the photodetector, then a misalignment signal preamplifier, a difference-signal band-pass amplifier, a synchronous detector, a power amplifier, a frequency discriminator, and two electric servomotor with a speed reducer, the two gear trains coupled through an

L-frame. The technical characteristics of the SAS-3 system are: operational distance to object 8-100 m, maximum tracking speed 20°/s, maximum tracking error 0.5°, field of view 5°, maximum angle of rotation 360° in the horizontal plane and 180° in the vertical plane, length of continuous operation 10 h, weight 12 kg. The camera attachment operates from a 12 V battery or rectified power supply and draws a current of up to 2 A. Figures 2; references 3.

Multifunctional Digital Processor of Sound Signals

937K0034A Moscow TEKHNKA KINO I
TELEVIDENIYA in Russian No 9, Sep 92 pp 28-34

[Article by G. I. Vlasov, All-Russian Scientific Research Institute of Radio Reception and Acoustics imeni A. S. Popov; A. A. Ignatyev, B. T. Mozgirev, and B. D. Matyushkin, Scientific-Industrial Enterprise "Digiton"]

[Abstract] The design of a multifunctional digital processor of sound signals is analyzed, specifically the design of one intended principally for frequency, dynamic, dynamic-time, and frequency-time processing in accordance with respective sets of algorithms based on the canonical difference equation applicable to all these processing modes except the dynamic one. For the elemental base is selected large-scale + very-large-scale integration in preference to small-scale + medium-scale integration or medium-scale + large-scale integration so as to facilitate real-time operation. This requirement implies the necessity of redesigning the conventional processor architecture into one suitable for sequential, step matrix, iterative, and parallel-sequential calculations. The processor has a modular construction, the corresponding modules in all channels being identical and thus entirely interchangeable. They contain electronic circuitry standardized so as to ensure a maximally uniform architecture, which also features flexibility and some redundancy. The hardware includes, in addition to encoders and decoders, the following devices with respective programming software: 1) graphic and parametric equalizers which correct the amplitude-frequency characteristics of sound channels; 2) automatic dynamic range regulators (limiter + compressor + expander + noise suppressor) with either broken-line or smooth static characteristics; 3) reverberators simulating the acoustic characteristics of a facility such as the studio, particularly early reflections of generated sound and subsequent multiple secondary reflections of sound by walls, ceiling, and other obstacles; 4) synthesizers of special effects such as musical ornaments ("chorus", "echo", "flanging", "chorus", "vibrato"). The users can, moreover, convert the processor hardware for operation with emulator software to suit their own more stringent requirements. Figures 5; references 14.

Reducing Distortions in TV Systems With Sequential Transmission of Color Lines

937K0034B Moscow TEKHNKA KINO I
TELEVIDENIYA in Russian No 9, Sep 92 pp 37-42

[Article by E. Z. Soroka and V. A. Khleborodov, All-Russian Scientific Research Institute of Television and Radio Broadcasting]

[Abstract] Preventing distortions in SECAM and MAC television systems with sequential transmission of color lines is considered, distortions in the form of color flicker

and moires being caused here by the vertical subdiscretization of the color components in the image. In theory these distortions can be prevented simply by adequate prefiltration and then, during restoration, by post-filtration which takes into account the twofold readout frequency step-down on the vertical sweep. In practice this is difficult because of the interlaced scanning. The problem is analyzed on the basis of Ignatyev's discretization of multidimensional signals theory (N. K. Ignatyev, 1963). Processes which take place during image dissection into lines and frames are, without loss of generality, viewed only in the vertical-time domain, i.e., in the (y,t) plane at an arbitrary but fixed horizontal coordinate x. The vertical-time spectrum of an image is calculated following a two-dimensional Fourier transformation of the image function. Alternation of color-difference signals is known to result in formation of a vertical-time structure with a thinned out readout grid. The thinning-out process can be and is here treated as multiplication of the original readout grid by a harmonic commutating function, the form of this function being somewhat different for the SECAM system with continuous alternation of signals and for the MAC systems with alternation of signals interrupted by resetting of the alternation-controlling lines counter during every blackout period. Following an analysis of distortions with the aid of this mathematical apparatus, it is shown to be possible to suppress these distortions by pre- and post-filtration with purely vertical filters having a frequency characteristic of the general form $K_1(v,w) = \sum \text{rect}(4Yv/2\pi - 2k)$ over all k's ($\text{rect } x = 1$ for $|x| < 1/2$, $\text{rect } x = 1/2$ for $x = 0$, $\text{rect } x = 0$ for $|x| > 1/2$). Flicker and moires are shown to be thus eliminated in the SECAM system and in a MAC system, but at the expense of a weakened vertical color definition: one four times weaker than that of the luminance component. The simplest practical way to implement this method of suppression is to use a cosine prefilter with a $K(v,w) = \cos Yv$ frequency characteristic for both R-Y and B-Y color-difference signals, this filter being followed by one delay line per horizontal line on the R-Y side and then an adder which generates the sum of the delayed filter output signal (R-Y) and the undelayed one (B-Y). In this scheme it is necessary to delay the luminance signal by one horizontal line so that the delay of chrominance signals by one horizontal line is accounted for in both the encoder and the decoder. The effectiveness of such a filter was verified in several experiments, one of which involved PAL to SECAM transcoding with the decoder acting as such a filter. Figures 9; references 6.

Improving Design and Manufacture of LI484 and LI485 Gleticons

937K0034C Moscow TEKHNKA KINO I
TELEVIDENIYA in Russian No 9, Sep 92 pp 42-45

[Article by M. A. Kalantarov, V. A. Kozlov, V. A. Krupchatnikov, and A. G. Lapuk, Scientific-Industrial Association "Elektron"]

[Abstract] Certain improvements in both design and manufacture of LI484 and LI485 gleticon TV transmitter camera tubes have been made so as to ensure a higher signal-to-noise ratio at the camera exit. This was achieved by increasing the distance from equalizer grid to signal plate and at the same time tightening the tolerance limits on

variation of this distance, which lowered the output capacitance of the tube from 4.0 pF to 3.0 pF without making the alignment of rasters less precise. An experimental study has established the feasibility of limiting the area of the signal plate so that it will fully cover an entrance disk only 19 mm in diameter instead of the one 23 mm in diameter it covers now. The output capacitance was further lowered as far down as to 2.3 pF by placing the entrance lead to the signal plate, a thin platinum ribbon, not on the lateral surface of the cylindrical tube envelope but rather in the entrance window "disk" near the solder bead. A new process has been developed for producing a PbO_2 signal plate which has a lower than 3000 Ω electrical resistance but a not lower than 0.75 optical transmission coefficient, this process involving pyrolytic PbO_2 aerosol deposition inside the tube envelope. Lowering its resistance to the 250 Ω raised the signal-to-noise ratio to the 55 dB level. The maximum permissible signal plate resistance was determined analytically, from the numerically evaluated dependence of the decrement of the signal-to-noise ratio at the preamplifier output on the signal plate resistance. Calculations were made on the basis of an equivalent series circuit representing a converter of target current into preamplifier input voltage, with a capacitive coupling plate-grid and with thermal noise as well as shot noise in the signal plate. This circuit includes a noise-equivalent voltage source in series with the signal plate resistance and the parasitic plate-grid coupling capacitance across the input of that preamplifier, which loads the signal plate with an also noisy resistance shunted by a parasitic grounding capacitance. The smaller this grounding capacitance is, the lower should be the signal plate resistance. The two parasitic capacitances form a voltage divider which at sufficiently high frequencies splits the thermal noise so that an increase of the grounding capacitance will decrease the thermal noise and increase the shot noise in the signal plate, while a decrease of the coupling capacitance will decrease the output signal-to-noise ratio. Increasing the preamplifier input resistance will proportionally raise the preamplifier input voltage and will lower the thermal noise to an eventually negligible level. Numerical estimates indicate that the ratio of signal to thermal noise will not decrease more than by 1 dB if the signal plate resistance does not exceed 250-600 Ω . The decrement of the signal to thermal noise ratio will also become smaller when the cutoff frequency of the amplifier channel is raised above its nominal 6 MHz. Figures 5; references 3.

Television Slide Projector With Charge-Coupled-Device Readout Line

937K0034D Moscow *TEKHNICA KINO I*
TELEVIDENIYA in Russian No 9, Sep 92 pp 46-49

[Article by A.M. Skrylnikov, A.Yu. Bekorevich, I.I. Yakubov, and M.P. Akimovich]

[Abstract] A television slide projector is described which uses a 1200 ShchL5 charge-coupled-device readout line consisting of 1024 photosensitive elements, resolutions of up to 700 TV lines thus being attainable and compatibility with the image scanning standard being ensured. The projector includes a light filter and a condenser between the light source and the slide, an objective, an optomechanical frame scanner, and the readout line at the end. The frame scanner is a precision galvanometer with an oscillating mirror and a movable solid iron core, this kind having been

selected in preference to others on account of its small size and technical simplicity. The condenser is a compound lens with a double-concave one between a plano-convex one facing the light filter and a convexo-plane one facing the slide. The objective consist of three lenses, a double-concave one between a concavo-plane one facing the slide and a double-convex one facing the scanner. A prototype of this projector was built with a 20 W incandescent lamp as light source, with scanner drive control, with the CCD image readout line, a color signal decoder, a black-and-white monitor, and a color TV receiver. The projector was tested on the TIT0249 Television Test Table, images of which were being displayed on the monitor screen. It was mounted on a 270 x 360 mm² large solid metal base plate. Figures 7; references 4.

Efficient Comprehensive Image Encoding for Narrow-Band Television Systems

937K0034E Moscow *TEKHNICA KINO I*
TELEVIDENIYA in Russian No 9, Sep 92 pp 49-53

[Article by E.B. Makhmudov, E.N. Biktimirov, and V.S. Dyakov, Uzbek Scientific-Industrial Association "Kibernetika" (Cybernetics) at Uzbek Academy of Sciences]

[Abstract] An efficient method of comprehensive television image encoding is proposed which combines analog and digital processing of video signals is proposed. The operation includes encoding based on linear prediction, cosine transformation selected for maximum compression, and adaptive differential pulse-code modulation, followed by filtration and subdiscretization of chrominance components to reduce spectral redundancy as well as space and time redundancy so that digital transmission of video information is slowed down. This television system has on the transmitter side four analog processors, one for each of the three color signals and one for the sound signal. From here the four signals proceed each to an analog-to-digital converter, all four converters operating with common control and synchronization circuitry. The four digital signals proceed each to a digital processor, the sound signal to a one-dimensional processor and the three color signals to two-dimensional ones. All four processors are connected to a common stabilized power supply. Each processor sends its output signal to a differential pulse-code modulator, an adaptive one in the Y color channel. All four modulators feed into a multiplexer, which sends the modulated digital signals through an interference encoder to the transmitter tube. Decoding on the receiver side is a reverse operation, the four signals passing from the receiver through an interference decoder to a demultiplexer, which separates them and sends each to a differential pulse-code modulator. The four modulated signals proceed each to a digital processor, all four processors operating with common control and synchronization circuitry. From here the he modulated signals proceed each to digital-to-analog converter. All four converters are connected to a common stabilized power supply. Each converter sends its output signal to an analog processor, the four processors then restoring picture and sound. The design of this digital color video communication system was optimized with the aid of an SM-4 minicomputer simulating the cosine transformation, a Standard System 1840 computer being used for evaluating the dependence of the distortion factor DLT (sum of absolute differences between original and restored image readouts, divided

by the number of image elements subject to encoding) on the signal compression ratio. Two versions of a video processor for such a system were built and tested: 1) a 4-point one with medium-speed integrated microcircuits (K-555RT 256x4 read-only memory + multiplication, K-551R 23 cache memory, K-531TM8 registers, K-155RU2

peripheral memory) for four additions, four subtractions, and four multiplications (time 80 ns, power 20 W); 2) an 80-point 8-digit one built with series K-1500 ECL integrated microcircuits for 15 additions, 13 subtractions, and 20 multiplications (time 60 ns maximum, power 46.5 W). Figures 2; references 12.

Short-Term Forecast of Strong Earthquake Time Using Radio Wave Methods

937K0019A Moscow DOKLADY AKADEMII NAUK
in Russian Vol 323 No 6, Apr 92 pp 1064-1067

[Article by I.L. Gufeld, V.F. Marenko, Geophysics Institute imeni O.Yu. Shmidt at Russia's Academy of Sciences, Moscow and Geosphere Dynamics Institute at Russia's Academy of Sciences, Borovoye Observatory; UDC 550.343.2]

[Abstract] The urgency of earthquake prediction and the difficulties of searching for and identifying the correlations between the disturbances of various geophysical fields with the processes at the concluding stage of earthquake preparation due to the lack of geological and geophysical data on the unstable state period of the rock medium and, consequently, the short-term earthquake warning period aroused interest in using the methods whose recorded parameters are unrelated to the observation point selection yet cover a large area of monitoring which may contain several potentially dangerous seismic zones. In particular, the superlong wave (SDV) oblique incidence sounding method meets these requirements. The method amounts to analyzing the SDV propagation characteristics over transmitter-receiver paths passing through seismically active regions whereby an Omega phase hyperbolic navigation system (FRNS) is used as a signal source. Nocturnal phase perturbations of the signal before several earthquakes are plotted. The origin of the signal phase perturbations which are precursors of earthquakes is explained and the results of pilot forecasts

are cited. The expediency of setting up a network of radio wave seismic activity monitoring with intersecting and fan-shaped paths is stressed. The authors are grateful to Academician M.A. Sadovskiy who submitted this article for publication. Figures 2; references 6.

Electromagnetic Wave Diffraction by Magnetodielectric Bodies

937K0019B Moscow DOKLADY AKADEMII NAUK
in Russian Vol 323 No 6, Apr 92 pp 1092-1096

[Article by Ya.N. Feld; UDC 538.56]

[Abstract] The problem of electromagnetic wave diffraction (which was solved in 1974 by computing two-dimensional integrals and solving the first boundary problem of electrodynamics) is considered from the viewpoint of summarizing and extending the methods, proposed in 1986 and 1989 for bodies with zero impedance boundary conditions, to magnetodielectric bodies. To this end, a three-dimensional problem is formulated and a uniform body with known parameters is considered; the surface which bounds it is assumed to be sufficiently smooth; the total field in the body area is expressed through the primary wave incident upon the body and the unknown field which satisfies Maxwell's uniform equations everywhere. Auxiliary fields are introduced; the original problem is reduced to a two-dimensional problem and the coefficients of the scattered field's radiation patterns are calculated. The article is submitted by Academician A.F. Bogomolov. Figures 1; references 5.

Identification of Modal-Physical Model Parameters of Deformable Spaceship

937K0043A Moscow AVTOMATIKA I
TELEMEKHANIKA in Russian No 7, Jul 92 pp 19-25

[Article by Yu. I. Nekhoroshy, V. Yu. Rutkovskiy, V. M. Sukhanov, Russian Academy of Sciences Institute of Control Problems, Moscow; UDC 62-501.72:629.73]

[Abstract] An algorithm for identification of space parameters of a mathematical model of deformable space ship (DSS) was developed based on a modal-physical description of its dynamics. A model was constructed for identification of natural frequencies and excitation coefficients at the initial moment of time. It was determined, that at some fixed moments of measurements, the identification algorithm can exhibit instability in some regions of values of the initial DSS conditions. With the developed algorithm it was possible to identify the natural frequencies with a smaller than 1 percent error, and the excitation coefficients with an error which was smaller than 5 percent, under conditions of maximum deviation of the initial values of the parameters from their accurate value. The instability of the identification algorithm in the region of the initial conditions of the DSS was removed by displacing the moments of measuring the angle and the angular velocity in accordance with the developed methods for correction. This made it possible to assure the stability of the identification algorithm for the entire region of the initial values of the DSS condition.

Asymptotic Normality and Estimates of the Conversion Rate of Algorithms for Identification of Nonstationary Objects

937K0043B Moscow AVTOMATIKA I
TELEMEKHANIKA in Russian No 7, Jul 92 pp 44-55

[Article by M. V. Bondarenko, A. S. Posnyak, Russian Academy of Sciences Institute of Control Problems, Moscow; UDC 519.712.7]

[Abstract] A situation is common when by identification of nonstationary objects, vector changes of the object's time-varying parameters are described by linear differential or difference equations with constant coefficients. Linear algorithms of the Kalman type filter are used for the identifications. However, a rigorous justification of these algorithms, that is, proof of their convergence, estimates of the conversion rate, and obtaining the lower limit of accuracy is still not a resolved problem. The solution of this problem is discussed here. The divergence rate of the identification processes of nonstationary objects are estimated, and the conditions are determined for the character of observations and type of instability, which guaranty the asymptotic normality of the parameters estimates. The expanded algorithm for identification under nonstationary conditions, which is developed here, supports the validity of estimates and the asymptotic normality of weighted, linearly independent components of the error vector. The convergence rate greatly depends on the type of object and multiplicity of G matrix, which has no latent roots outside the unity circle. Figures 7, references 8: 3 Russian, 5 Western.

Multicriterion Control of Local Computer Network Employing Varying Procedures for Controlling Access to Data Transmission Medium

937K0043C Moscow AVTOMATIKA I
TELEMEKHANIKA in Russian No 7, Jul 92 pp 156-164

[Article by V. I. Borzenko, Russian Academy of Sciences Institute of Control Problems, Moscow, V. S. Kosykh, Scientific Production Association "Tayfun", Obninsk, E. A. Trakhtengerts, RAS ICP, Moscow, V. M. Shershakov, SPA "Tayfun", Obninsk; UDC 681.324]

[Abstract] A new approach is discussed for controlling local computer network (LCN) by applying methods of multicriterion control. In order to assure an optimal functioning of the LCN it is proposed that in addition to the application and development of traditional mechanisms for combating overloads of the LCN, a method based on selecting different procedures for controlling the access to the data transmission medium must be employed. Also, it is suggested that the utilization estimates, and the selection of the LCN control mode (access method) must be carried out within the framework of the theory of multicriterion optimization. Its application makes it possible to construct a flexible and efficient apparatus, which can be applied in a real LCN for realization of the developed control mechanisms, taking into account the users requirements. For testing the efficiency of the suggested approach for elimination of overloads, an experimental model was developed of a ring-type local computing circuit of personal computers and the required procedures for its application and the results are described. It was possible to obtain the characteristics of the network under different operating conditions and to analyze the asymptotic behavior of transmission and the response of the network with an increased number of calls for each type of access. This information was used for constructing a multicriterion sorting method for estimating the condition of the network and selecting the type of access for each interval of the network functioning. Figures 8, references 4: 1 Russian, 3 Western.

Estimate of Structural Differences in Computers Controlled by the Data Flow

937K0043D Moscow AVTOMATIKA I
TELEMEKHANIKA in Russian No 7, Jul 92 pp 165-177

[Article by O. M. Brekhov, V. A. Moraru, Moscow Aviation Institute; UDC 681.324]

[Abstract] One of the principal factors limiting the efficiency of multiprocessor computers, controlled by a data flow is the transmission of tokens in lines connecting the memory units with the processors. Three structures of the dataflow computers are examined here, depending on the level of the token's access from the memory units to the processors, and their probability models are discussed. Efficiency estimates are provided of the computers controlled by the data flow depending on their structural parameters, the character of the problem, the quantity and speed of the memory units and processors. It was demonstrated that the efficiency of the dataflow structures is high only when the multisequencing coefficient of the problem is greater than unity. With a high multisequencing potential of the problem, the efficiency of structures controlling the dataflow is near maximum. Figures 16, references 11: 7 Russian, 4 Western.

The Seminar on Conversion

937K0038A Moscow VESTNIK SVYAZI
In Russian No 8, Aug 92 p 6

[Article by; L. Vlad]

[Abstract] The first international seminar "Conversion of Telecommunications Systems" was held in Krasnoyarsk. It was attended by representatives of 24 countries. In his opening statement, the Deputy to the General Secretary of World Organization for Economic Cooperation and Development, S. Zekini pointed out that the conversion in Russia proceeds passively and recommended a two-level conversion system. In his opinion, the communication area is most suitable for investment of foreign capital, since it is the area least affected area by crises, and that the city of Krasnoyarsk is of a great interest to foreign companies because of many available resources. The other foreign speakers included: the representative of European Bank for Reconstruction and Development, Catherine Braun, and representative of the Economic Cooperation and Development Organization, T. Kelly. Russian speakers, Chairman of the subcommittee on Russian Federation Defense Industry, Yu. F. Tarasyuk, and Deputy Minister of Russian Communications, M. A. Yelizarov, concentrated on the conversion problems in Russia and the development of telephone communications in the country.

Television in Russia Today

937K0038B Moscow VESTNIK SVYAZI
In Russian No 8, Aug 92 pp 11-14

[Article by; S. V. Glubokov]

[Abstract] Problems are discussed of providing TV broadcast to the population of Russia. The analysis of statistical data indicate that 10,564 populated places in Russia cannot receive at least one TV program with a minimal quality, even though there are 325 powerful stations with 644 transmitters and about 7000 small power repeaters. The future development of the TV distribution network must concentrate on using the space communication systems. The prime area of concern is to increase in 1992 the number of space vehicles in the orbital group "Gorizont" to ten, and to develop a five-zone broadcast of TV programs over the entire territory of Russia. The "Gorizont" cosmic vehicles were developed in the 70s and do not satisfy the contemporary requirements. The new generation space vehicles "Gals" and "Gelikon" are part of the program for development of the satellite communication and broadcast system "Rossiya" for the 1991-2000 period. The economic problems, which greatly retard the development of Russian TV are also discussed. A list of populated places which do not receive TV programs is provided.

Domestic Telecommunications in the Global Coordinate System

937K0038C Moscow VESTNIK SVYAZI
In Russian No 8, Aug 92 pp 20-23

[Article by; V. K. Shultseva]

[Abstract] While the telecommunications technology in countries with a developed market economy experiences unprecedented growing, Russia is still a country relying

primarily on the telegraph. The telephone communications have never enjoyed a priority treatment in the USSR, and now is the time to take measures for catching up with the rest of the world. Factors contributing to the rapid development of telecommunications in industrial countries are discussed. It is pointed out that in the telecommunication area mechanisms are acting, which combine stimulation of competition within the industry with strict state control of the communication companies activity. The unfavorable situation in the domestic telecommunications development is aggravated by the negative situation in the economy, common to the entire country. There is a deteriorated discipline of delivering new technology, shortage of cables and other telecommunications equipment. Termination of the "Council of Mutual Economic Assistance" and interruption of economic contacts with the Sovereign States due to political changes contribute to slowing down the development of the telecommunications in Russia. Recently established joined enterprises, with the leading foreign companies will not produce results until 1996. It is advisable that the company "TELEKOM", a domestic monopolist of the communication industry, should be more oriented toward expansion and diversification of domestic production rather than procurement of the equipment abroad.

A Method for Statistical Recoding of the PCM Signal

937K0038D Moscow VESTNIK SVYAZI
In Russian No 8, Aug 92 pp 31-33

[Article by; I. V. Kokoshkin]

[Abstract] Block coding is considered to be a most promising method for statistical packing of a standard PCM signal. It consists of separating the sequence of signal readings into a particular length packages, their analysis and a consecutive transmission of information on the number of the maximum readings in the package. This method can increase the efficiency of the PCM equipment, but there are some shortcomings.

The transmission capacity required for transmission of messages with a non uniform probability can be reduced by using separable non-uniform codes. The familiar Huffman methods and quasi-optimal Shannon-Fano method for a discrete stationary source with redundancy can not be applied for this problem because of non-zero probability of occurrence of code combinations larger than seven digits, which is absolutely unacceptable since it would increase the complexity of equipment for coding and decoding. An attempt is made here for developing a code which is free of this shortcoming, i.e. optimal non-uniform code with a limitation on the maximum length of the code combination. This task has no direct analytic solution, but an iterative approach is possible using consecutive approximations. The described method can be readily realized as a coder on ROM, installed at the output of the PCM equipment, and will significantly increase the efficiency of data transmission. Table 1, references: 2 Russian

About Conditions and Most Important Problems in the Development of Construction and Manufacturing Technology of High-Pressure Heaters of Thermal and Nuclear Power Stations

937K0056A Moscow ELEKTRICHESKIYE STANTSII in Russian No 9, Sep 92 pp 27-34

[Article by B. F. Vakulenko; UDC 621.184.4.001.8]

[Abstract] An analysis is made of the conditions in the development of high pressure heaters (HPH) for thermal electrical power stations, which is based on earlier published reports, the latest HPH designs for nuclear power plants, and also on the contemporary developments by the production association "Krasnyy kotelshchik". Three groups of the HPH are discussed. The first group includes heaters for turbo-generators with below critical steam parameters, heaters for turbo-generators with above critical steam parameters, constitute the second group, and HPH for nuclear power plant turbo-generators belong to the third group. A program is proposed for the development of constructions and manufacturing of the HPH for each of these groups in the next five years. A transition to helical-coil heaters made of 22 x 3.5 mm coils to replace the 32 x 4-5 mm coils is encouraged for the first group heaters, since these coils proved to be effective; design, technological preparations, manufacturing and testing of chamber type heaters with 16 x 1.4 mm coils made of 08X14MF steel must be intensified. In the opinion of the author, the chamber type construction of heaters has definite advantages. Transition is also proposed to collector-helical heaters with 22 x 3.5 mm coils for the second group. For the third group, the development program includes production of a first industrial batch of chamber type HPH-K-2550-12A pilot samples for turbo-generators K-1000-60/1500 and K-100-60/3000 for nuclear power plants, as well as their testing and serial manufacturing. Figures 2, tables 4, references 11: 10 Russian, 1 Western.

Experience in the Application of Computer Aided Control and Management of Fundamental Technological Processes at Heat and Electric Power Plant TETs-20 MOSENERGO

937K0056B Moscow ELEKTRICHESKIYE STANTSII in Russian No 9, Sep 92 pp 37-41

[Article by I. A. Govorukhin, S. A. Zhukov, S. V. Kashanov, V. V. Sergeyev, L. L. Smelyanskiy, A. V. Solonin, Yu. K. Filonov, Moscow Institute of Electronic Machine Construction; UDC 621.311.22:658.5.011.56]

[Abstract] Seven basic concepts are formulated for a complex computer control and management of fundamental technological processes at heat and electric power plants (HEPP) by developing inexpensive and efficient computer information and controlling systems, capable for application with functioning plants, as well as with plants under construction. A contemporary computer information providing and measuring system has been developed and implemented at the Moscow TETs-20. This system has replaced the available recording and indicating instruments, it simplifies the work of machinists, processes and analyzes the output information on measurements, and submits for printing the required generalized data on the energy unit functioning in emergency and pre-emergency situations,

and during starts and shutdowns. Works on development of the computer information and control systems and the main principles for their implementation were approved by the MOSENERGO and were recommended for introduction at other thermal electrical plants in the country. Figures 2, references 3 Russian.

Contemporary Condition of Global Atomic Power Generation

937K0056C Moscow ELEKTRICHESKIYE STANTSII in Russian No 9, Sep 92 pp 43-46

[Article by T. Kh. Morgulova, Moscow Institute of Energetics; UDC 621.311.25:621.039]

[Abstract] A short review is made on the contemporary global state of production of nuclear power. Comparative charts show the generation of electrical energy of most European countries by nuclear power plants as a percentage of total energy produced by hydroelectric and thermoelectric power plants for 1985-1990. These charts illustrate that nuclear power is an important contributor to the overall production of electrical energy. Even after the Chernobyl accident the construction of nuclear power plants continues, although in some countries, because of the safety concerns, a reluctance is manifested to a continued construction of nuclear plants. Accidents can happen at any power plants, and the answer lies in taking measures to prevent violations in operation before accidents. A seven-level scale for estimating the seriousness of accidents at nuclear plants was developed by an international organization and was also introduced in our country on September 1, 1990. Accidents occurring in this country's nuclear plant are now regularly reported by the State Nuclear Control. During the period after introducing the scale, they were at a insignificant or intermediate level. The contemporary state of the nuclear power generation in the regions of the former USSR is shown in a table. In terms of power, this country is in third place, after the USA and France. Unfortunately, in terms of reliability and safety, the country's nuclear plants lag behind almost all foreign plants.

Methods Used for Accounting the Electrical Arc Resistance When Computing Short Circuit Currents in Lines With Voltages up to 1000 Volts

937K0056D Moscow ELEKTRICHESKIYE STANTSII in Russian No 9, Sep 92 pp 54-62

[Article by Z. V. Kotlyar, V. M. Zyatin, V. I. Polyakhov, Tulenergo - Cherepetsk State Regional Electric Power Plant; UDC 621.316.1.027.4.064.1.025.001.24]

[Abstract] Methods are discussed which are used for computing the electrical arc resistance with short circuits (SC). These methods can be conditionally divided into three groups. The first consists of accounting for the transient resistance, including the resistance of the power equipment terminals and active resistance of the arc with a specified invariant value. The second group involves carrying out a series of tests with metal SC and SC with an arc for different parameters of the electric line. In the third group the relationships are determined of open arcing, that is the relationship of the arc nonlinear active resistance as a function of its length and current in the arc. The particular features of the methods for each of the groups are discussed.

Formulae were developed for computation of the SC currents and tables are provided for determining the relationships of the open arcing. Examples illustrate use of tables for computing the SC current with arcing. Tables 2, references 14 Russian.

Analysis of Electrical Power Stations Equipment and Networks Malfunctions in 1991

937K0056E Moscow *ELEKTRICHESKIYE STANTSII* in Russian No 9, Sep 92 pp 73-78

[Article by N. F. Gorev, Russian Federation Ministry of Energy; UDC 621.311.002.5.004.65]

[Abstract] An analysis is made of the accidents at the electrical power plants in the network of former USSR Ministry of Energy. 87 accidents, 4,099 first level failures and 36,225 second level failures occurred in 1991. The total shortage of the energy supply was 139.2 million kW/h. For Russia, there were 59 accidents, 2,919 first level failures, and 23168 second level failures causing electrical energy shortages of 105.4 millions kW/h. In 1990, there were 208 accidents, 19,803 first level and 94,425 second level failures resulting in energy shortages of 159.0 million kW/h. For Russia these numbers were 130 accidents, 11,972 first level, and 50,741 second level failures. These figures indicate a significant reduction in the number of accidents, due to changes in the accidents accounting system introduced in August 1990. The major reasons for accidents in the electrical power plants lie in an unsatisfactory organization of technical maintenance, erroneous actions of the operating personnel, shortcomings in design and defects in equipment. Accidents and malfunctions which occurred at several power plants are described and the reasons are analyzed. It is predicted that even after reconstruction of the industry in countries of the former USSR to the 1990 level, and with further development, the electrical power system will operate in a mode of a constant overload, and reduction of reliability for at least 5-7 years, until decisions are made and implemented on increasing the investments.

Propagation of a Pulsed Charge Along Water and Ground Surface

937K0050A Moscow *ELEKTRICHESTVO* in Russian No 9, Sep 92 pp 19-23

[Article by E. M. Bazelyan, A. V. Khlopov, A. V. Shkilev]

[Abstract] A hypothesis about a leader without a "streamer" is discussed. According to this hypothesis the leader of a long spark is considered to be invariant with respect to the mechanism which generates currents feeding the discharge channels. In a sliding discharge, which is formed along a thin dielectric film placed on a metallic surface, a form of leader without a "streamer" can take place, where the current is generated due to the large natural capacity of the channel. A theoretically similar situation is predicted for a discharge along conducting surfaces, such as the earth surface. This hypothesis was experimentally tested in a dielectric tube positioned at a large distance from grounded electrodes and high voltage equipment under conditions which allowed using the results for determination of the

qualitative characteristics of the analyzed discharge shape. The hypothesis on the formation mechanism of the leader, along the surface of a conducting body is supported by the experiments, and it was demonstrated that predictions on the fundamental properties of the discharge were justified. The experiments also confirmed that the polarity has a weak effect on the progress of the discharge process. Figures 7, references 7: 6 Russian, 1 Western.

Criterion of Constructions Resistance to Electromechanical Effects of High-Current Discharges

937K0050B Moscow *ELEKTRICHESTVO* in Russian No 9, Sep 92 pp 24-26

[Article by S. K. Kamzolov]

[Abstract] Many electromechanical phenomena, including electromagnetic pressure due to ponderomotive current interaction occur when high current discharges, such as lightning, strike a structure. For example, residual deformations are produced on the shell of an airplane when it is hit by a lightning. A model is examined of ponderomotive current interaction in the discharge channel symmetrically flowing in a thin plate. The computation model for determination of the field of mechanical tensions in the plate also accounts for the additional pressures on the plate related to the pinch effect. A relationship was derived which allows to determine the threshold value of the discharge current amplitude causing deformations in the plate. A criterion was obtained determining the materials resistance to plastic deformations for a particular current of the discharge pulse. The critical value of this criterion can be obtained experimentally or by computations using the corresponding theory on the strength of materials. Figures 3, references 4 Russian.

Electromagnetic Effect of Train AC Lines on Metallic Communication Devices

937K0050C Moscow *ELEKTRICHESTVO* in Russian No 9, Sep 92 pp 26-34

[Article by A. V. Kotelnikov, A. V. Kosarev]

[Abstract] Currents and potentials can be generated in the pipelines and cables lying next to ac electrified railroads by electromagnetic induction. These currents can be hazardous in terms of electrical safety. A particularly hazardous situation can be produced with the interruption of metallic continuity because of electrical corrosion when a spark process occurs, generating heat energy capable of igniting the products transported by the pipelines. In order to estimate the electromagnetic effect of the railroad ac current on the underground communication (UC) lines, a method is developed for measuring the real contact resistances between the communication lines and the ground along the lines lying within the area of the electromagnetic effect of the railroad ac currents without interrupting the UC continuity. The obtained relationships for computation of voltages and currents at any UC cross sections make it possible to estimate the effect of heterogeneous circuit parameters on the emf generated at the points of the circuit interruption. Figures 6, references 8 Russian.

About Two Monographs on Technology of Automatic Control and Protection of Electrical Energy Systems

937K0050D Moscow *ELEKTRICHESTVO* in Russian
No 9, Sep 92 pp 68-69

[Article by V. A. Andreyev, F. Ye. Temnikov]

[Abstract] Publishing house "Energoatomizdat" published a second monograph of the associate professor of Moscow Energy Institute N. I. Ovcharenko, which, along with the first one, represents a unified scientific work, reflecting many years of the author's creative activity in the area of automatic control and protection of the electrical energy systems. A short review is made on the content of both monographs. It is pointed out that both books are written at a high theoretical methodological level and are results of original scientific research. A well justified classification of functional elements of devices for relay protection, automatics and telemechanics of the energy systems in accordance with functional operations made with the information signals deserves particular attention. A great contribution is made to studies and development of fast acting measuring transducers of active and reactive power. Almost an entire chapter is dedicated to the results of studies on operations with a double shorting to ground differential-phase protection systems of the DFZ-2 type, etc. References 3 Russian.

On Analysis of Protective Response of Automatic Circuit Breakers in Overcurrent Condition

937K0021A Novocherkassk *IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: ELEKTROMEKHANIKA* in Russian
No 4, Jul-Aug 92 pp 61-64

[Article by K. K. Namitkov, P. L. Pakhomov, V. N. Tereshin, V. A. Chernov, Kharkov Public Utilities Engineering Institute; UDC 621.316.573]

[Abstract] The use of a single-element approximation widely employed in published data in thermal analyses of various operating conditions of electric devices is suggested for deriving sufficiently simple engineering formulae which describe the protection response of automatic circuit breakers in the overcurrent condition, i.e., the operate time. The shape of the protection response curve is basically determined by the operation of the thermal clad metal tripping device which in this approximation is represented as an integral element. The protection responses of AYe2020 circuit breakers with a thermal clad metal release device computed in the single-element approximation at various operate times are plotted and the divergence between the curve and the experimental plot at an overcurrent ratio of >7 is noted and attributed to the circuit breaker's mechanical sluggishness. An analysis of the findings confirms the suitability of the proposed approximate theory for tentative engineering analyses of the time-current characteristics of circuit breakers with clad metal thermal tripping devices. Figures 1.

On Estimating Forced Electromagnetic Direct Current Device Operation

937K0021B Novocherkassk *IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: ELEKTROMEKHANIKA* in Russian
No 4, Jul-Aug 92 pp 65-68

[Article by V. N. Grevtsov, A. G. Nikitenko, V. P. Grinchenkov, Ye. A. Drozdova, Novocherkassk Polytechnic Institute; UDC 621.318.562/316.54]

[Abstract] The use of forced closing in order to decrease the overall dimensions and shorten the operate time or increase the initial traction force in modern direct current electromagnetic devices (EMA), e.g., electromagnetic parts of contactors, circuit breakers, relays, etc., is discussed and it is noted that the processes which determine the technical and economic indicators of direct current electromagnetic devices remain unclear. An attempt is made to establish the patterns which correspond to the processes occurring in this electromagnetic device and the possibility of taking them into account and using in direct current electromagnetic devices development in the case where the operate time and the initial tractive force are not the determinant values. The effect of an increase in the start-up/nominal voltage ratio on the failure rate of such direct current electromagnetic devices with a ballast resistor is analyzed. A formula is derived for calculating the winding failure rate as a function of heating. In particular, the issue of selecting an efficient forcing depth (the voltage ratio) and assessing its effect on the EMA performance and energy indicators is addressed. The dependence of the values characterizing the energy balance in the forcing circuit of one electromagnet and the dependence of the operate time on the current ratio are plotted. A numerical experiment is carried out on a DVK-3M interactive computer complex. Figures 2; references 2.

Attracting Western Partners and Joint Ventures

937K0057A Moscow *PRIBORY I SISTEMY UPRAVLENIYA* in Russian No 8, Aug 92 pp 1-3

[Article by A. S. Angel; UDC 339.13.012.42:681.2]

[Abstract] An analysis is made by the founder and first vice-president of the American company S/A Technologies, A. S. Angel on the present conditions of business and interactions between Western partners and the enterprises in the Commonwealth countries. Prospects for establishing productive relationships are also discussed. Recommendations are provided on measures that must be taken by the Commonwealth businesses to attract Western partner in order to trade with the West. The enterprises, and first of all, the managers must master some features of the trading mechanism and business management, practiced in the West. One problem lies in assuring accuracy and adequacy of translations from one language to the other. The other characteristic complexity is related to the ability to obtain information about prospective partners in the commonwealth countries. It appears that the Commonwealth businesses, despite desire to organize business relations, are very passive in disseminating information about themselves. It is recommended that a continuous intensive program to reduce production cost must be initiated, which should lead to increased profits and would provide protection against inflation. The quality standards must be brought up to the

Western level and a more effective quality control of production must be implemented. The importance of strategic planning and analysis of the market conditions is emphasized. ents

Adapting Domestic Automatic Control Systems to Market-Economy Requirements

937K0057B Moscow PRIBORY I SISTEMY
UPRAVLENIYA in Russian No 8, Aug 92 pp 4-9

[Article by A. I. Korneyeva; UDC 658.012.011.56.003.13:338.242]

[Abstract] A seminar-exposition was organized by the Moscow Institute for Enhancement of Qualifications of managers and specialists in the chemical industry. The objectives of the seminar was to promote interaction between the designers of automatic control systems (ACS) and clients. The seminar was held between January 21 to 24 and was represented by about 100 specialists and more than 10 companies—developers of the ACS hardware and software. The relationships between the state-owned, and other (small, joint, cooperative) enterprises which design automatic control systems and clients, representing factories, scientific production associations, design and assembling organizations of chemical, oil-refining and metallurgical industry were examined. Requirements to the automatic control systems under free market conditions were defined. Most attractive, from the client point of view, were the exhibitions of programs and hardware for development of automated work stations (AWS), hardware and software packages for support and development of the ACS. The principal conclusions of the seminar were that due to financial considerations there is a sharp drop in interest for new designs, and that the quality of products is very low. The institutes have not learned to pay attention to the market demand analysis, and the scientific and engineering groups disintegrate faster than the demand is growing.

Computer Aided Design and Technological Preparations for Manufacturing Using IBM PC/XT/AT type Computers

937K0057C Moscow PRIBORY I SISTEMY
UPRAVLENIYA in Russian No 8, Aug 92 pp 14-16

[Article by Yu. A. Privalov; UDC 658.512.4.011.56]

[Abstract] A review is made of systems developed by the Scientific Production Association "Litstankoproekt" (Vilnius) in the area of automation of technological preparation for manufacturing, and of the prospects of developing and implementing integrated computer aided design systems using personal computers of the IBM PC/XT/AT type. A CAD-TP type was developed in 1989. It was intended for automated design of technological processes of machine details. In 1990 a CAD-VM system was developed for automatic design of registers holding information on required materials, composition of the product, details, units etc. The CAD-TP and CAD-VM logically supplement each other and make it possible to increase the efficiency of solving the problems of preparation and control of production. The great graphic capacities of the IBM PC were utilized by developing in 1991 a CAD-KE system for automated design of sketches of mechanical processes and other similar documents. In terms of capacity and range of problems that can be handled, the CAD-KE system fully

satisfies the requirements to the CAD systems, but at this point it is a sketch system. It is projected that this system will be used as a base for developing high efficiency professional CAD-K and CAD-T systems in 1992.

Design Similarity of Parametric Superposable Electromagnetic Transducers

937K0057D Moscow PRIBORY I SISTEMY
UPRAVLENIYA in Russian No 8, Aug 92 pp 20-23

[Article by A. I. Merkulov; UDC 620.179.142]

[Abstract] Parametric electromagnetic superposable transducers (ST) are needed for remote sensing of varying gaps between two surfaces in hard to reach sections of monitored devices (MD). Problems are examined, related to improvements of parametric eddy current transducers for operations in not easily accessible control areas. The feasibility of employing integrated technology for manufacturing the transducers is also examined. Equivalent circuits for the ST are developed based on the electromagnetic field topology in a form of enlarged tubes of magnetic flux of a simple geometry. The principal types of ST that can be manufactured using integrated technology and capable of operating in hard to reach areas of the monitored devices include co-planar transducers on a magnetic substrate, where the plane of the coil's winding is parallel to the surface of the monitored device, and orthogonal transducers on a non-magnetic substrate, where the plane of the coil's winding is perpendicular to the monitor devices surface. A comparison was made between the basic parameters: the equivalent diameters of the MD-ST system when monitoring non-magnetic and magnetic MD, respectively, and the maximum coupling coefficients.

Photo-Electric Digital Converter of Small Angular Displacements

937K0057E Moscow PRIBORY I SISTEMY
UPRAVLENIYA in Russian No 8, Aug 92 pp 23-24

[Article by A. I. Merkulov; UDC 681.586.322.53.082.52]

[Abstract] Photo-electric portable digital angle converters (DAC) are widely used for determining the spatial coordinates of the controlled objects in systems for control of different objects and technological processes. Along with the DAC operating in the 0...360° range of angles, converters are in demand for a small range of angles (sector), which have more stringent requirements in terms of accuracy and resolution. An absolute, portable photoelectric (sectorial) digital angle converter was developed with a measurement range in the 2°48 min sector and 2°48 min/2¹³-1.25 seconds resolution. The converter incorporates multi-element photo-detectors, positioned along radial directions. The converter is insensitive to a non-identical drift of the photo-detector sensitivity distribution. The insensitivity is achieved by employing a single fiber-optical collector. A block diagram of the precision counting channel is provided, including a diagram explaining the principles of its operation. The main advantage of the multi-element photo-detector is a small drift of the sensitivity distribution due to temperature changes, as well as the possibility of the element's illumination by a single source. Figures 2, references 2 Russian.

Optical Sensor of Pressure Used in Fiber-Optics Communication Lines937K0057F Moscow *PRIBORY I SISTEMY*
UPRAVLENIYA in Russian No 8, Aug 92 pp 25-26

[Article by V. N. Moiseyenko, Yu. I. Bogatyrev, V. I. Pastukhov, V. V. Klimenko, I. I. Peters; UDC 681.586]

[Abstract] Results are described of studies, which demonstrate a feasibility of employing piezoelectric materials for development of optical hydrophones with sensitivity of about 10^{-4} Pa/Hz^{1/2}. Parameters characterizing the sensitivity of piezoelectric sensors were computed. A piezoelectric pressure sensor was developed and its structure is described. The sensor contains a membrane, a sensing element and polarizers. The sensitivity of the sensor was determined by recording the signal using a synchronous detection method. The acoustic wave was generated by a loudspeaker (standard acoustical pressure of 0.3 Pa), and the threshold electric power to the loudspeaker for an audible signal was measured. The measurements demonstrated that the minimum electrical power delivered to the loudspeaker was about 2.5×10^{-3} W. Assuming that the sound power is proportional to the electrical power, the sensitivity threshold of the sensor was determined from the pressure. With the 200 Hz bandwidth of the amplifier, the sensor sensitivity was measured as being on the order of 3×10^4 Pa/Hz^{1/2}. Figures 2, tables 2, references 6: 3 Russian, 3 Western.

Semitone Thermographic Video-Printer937K0057G Moscow *PRIBORY I SISTEMY*
UPRAVLENIYA in Russian No 8, Aug 92 pp 38-39

[Article by V. A. Alekhin, V. V. Kuznetsov, V. D. Paramonov; UDC 621.78:681.327.11]

[Abstract] Video printers were developed in the Moscow Institute of Radioengineering Electronics and Automatics. The printers function on thermal principle and use thermochemical paper. Standard video signal from an electron beam display or a video monitor are applied to the printer input. The first model of a two-gradation video printer is employed with several medical ultra-sound instruments for diagnostics. A new model, a semitone video printer ELUR-TVP 2, is described here. The thermographic video printer consists of a printing mechanism with a linear thermal printing head, a control unit and a power supply source. Since there are no moving parts, the noise intensity is very low. Because of simplicity of the tape transport construction no special servicing is needed. With the thermal printing, copies can be obtained without intermediate steps. No special adapters are required. Technical characteristics and a block diagram of the printer circuit is provided. Figures 2.

Set of Thermal Printing Matrices for Scaled Echogram Recording on a 110 mm Wide Tape937K0057H Moscow *PRIBORY I SISTEMY*
UPRAVLENIYA in Russian No 8, Aug 92 pp 39-40

[Article by V. N. Filatov, L. A. Zabrodin; UDC 621.3.089.9.535.682:681.883]

[Abstract] Specialists of the Yaroslav Scientific Production Association "Elektronpribor" have developed and manufactured experimental samples of a set of thermal printing matrices for recording echograms on a 110 mm wide tape of thermosensitive TKhB type paper. These matrices were ordered by St. Petersburg production association "North-East Aero-Geodesy" and are manufactured in Europe for the first time. A method of electrical spark is normally used for echogram recording. Despite some advantages, this method has certain shortcomings, which are not exhibited by the thermal method. Composition of the set of thermal printing matrices STPM-365 is described and the fundamental technical characteristics are listed. An analog of this set, a TPM M0110NF1, has been mass produced by the Mogilev factory of the Production Association "Tekhnopribor", for the past several years with an annual output of several thousands. Figures 2, references 3 Russian.

Deposition of Resistive Layers by a Magnetron Sputtering of RS-3710 Alloy937K0057I Moscow *PRIBORY I SISTEMY*
UPRAVLENIYA in Russian No 8, Aug 92 pp 40-41

[Article by V. I. Starov; UDC 621.3.049.776.21]

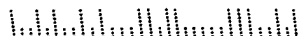
[Abstract] Some characteristics of vacuum sputtering apparatus AUB 289 00.00.000 "Magnetron" are described. The sputtering apparatus is very efficient because it takes not more than 10 minutes to produce vacuum, while the process of sputtering of the resistive layer lasts between several seconds to a few minutes. Studies were conducted on the apparatus capacity for sputtering the resistive films, and test were conducted with a sample; sputtering methods were developed and the characteristic of the obtained films were determined. A resistive alloy RS-3710 was used as a target. The resistive alloy was sputtered on devitrified glass substrate at temperature of 520°K and argon pressure in the pump between 0.7 and 1 Pa. Curves were obtained showing the relative changes of the resistive films resistivity as a function of its value, and the temperature coefficient of test resistors as a function of the surface resistivity. It was demonstrated that films with a resistivity value in the 1000 Ohm region can be used for obtaining stable thin-film resistors based on resistive films produced by a magnetron sputtering of RS-3710 alloy. Figures 2

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